Addressable Field Enhancement Microscopy

Published date: Jan. 10, 2011

Technology description

Background

Light microscopy has proven to be a remarkably powerful tool in the biomedical sciences. The principal strength of light microscopes lies in the ability to image dynamic, often living, biological specimens and tissues. Recent work in multiphoton excitation of fluorescence and in harmonic microscopy has dramatically extended the capabilities of this instrument; the development of near-field optical microscopy has broken the "resolution barrier" and has allowed researchers to optically image sub-wavelength structures. However, the resolution enhancement provided by single-tip near field optical microscopes is limited by its speed and fragility.
Current research in the field is to use nanoscale arrays of metallic or semiconductor islands, which serve the same purpose of single tip. However, current nanoscale array methods do not provide adequate methods for distinguishing signals from the different islands and therefore resolution suffers.

Technology Description

This is a nanoscale array technology that provides the means for distinguishing the signals originating from different islands in the nanoarray structure thereby enabling superresolution microscopy on the nanoscale. Methods include: electrooptic, thermal, and polarization techniques.
Nanoscale arrays may be manufactured by any of a variety of standard lithographic techniques. The wavelength used for the lithography may be much shorter than that used for microscopy, allowing superresolution at the observation wavelength.

Application area

For nanotechnology to continue to develop, advancements in imaging tools are necessary to examine and document what is being developed. This microscopy technology enables video-rate imaging with near-field resolution. It provides:
Increased speed
Increased resolution
Increased field of view
Increased versatility

Institution

The University of New Mexico

Inventors

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